CSE 4308 / 5360 - Artificial Intelligence I

Assigment-7: Planning

Fall 2007, Due Date: Tuesday 11th Dec 2007, 2:00 pm

Submit written part in the class and coding part by email to Instructor and TA.

1. Consider following actions:

   ACTION1 (Precond: $A \wedge \neg C$ Effect : $\neg A \wedge C$)
   ACTION2 (Precond: $\neg A \wedge C$ Effect : $X \wedge A$)
   ACTION3 (Precond: $\neg B$ Effect : $Y \wedge \neg Z$)
   ACTION4 (Precond: $\neg C$ Effect : $\neg Y \wedge Z$)
   ACTION5 (Precond: D Effect : Q)
   ACTION6 (Precond: $Q \wedge \neg Z \wedge A$ Effect : R)

   Planning Problem
   Start State: $A \wedge \neg B \wedge \neg C \wedge D$
   Goal State: $R \wedge X \wedge Y$

   a. Use any one of the POP methods introduced in the class and solve the above planning problem. **(only for CSE 4308 Class -10 points)**
   b. Use both the POP methods introduced in the class and solve the above planning problem. **(only for CSE 5360 Class- 20 points)**

   For Both CSE 4308 and CSE 5360 Class

   c. Did your POP algorithm resolve any conflicts during solving the above planning problem? If yes, please give a brief description of what was the conflict and how was it resolved? **(5 points)**

   d. How many total order plans can be generated from your partial order plan for the above planning problem. **(5 points)**

   e. Give all the total order plans that can be generated using the partial order plan for above planning problem. . **(5 points)**

2. Consider a blocks world domain with the following actions:

OP(ACTION : Move (b,x,y)
PRECOND: On(b,x) ∧ clear(y) ∧ clear(b) ∧ Moveable(b)
EFFECT : On(b,y) ∧ clear (x) ∧ ¬ clear(y) ∧ ¬ on(b,x))

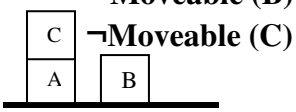
OP(ACTION : MoveToTable(b,x)
PRECOND: On(b,x) ∧ clear(b) ∧ Moveable(b)
EFFECT : On(b,Table) ∧ clear (x) ∧ ¬ on(b,x))

OP(ACTION : CheckBlock(b)
PRECOND: Clear(b)
EFFECT : KnowsWhether ("Moveable(b)"))

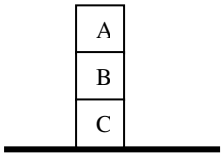
OP(ACTION : Unlock(b)
PRECOND: Clear(b) ∧ ¬Moveable(b)
EFFECT : Moveable(b))

Planning Problem:

Start State



Goal State



For Both CSE 4308/5360 Class

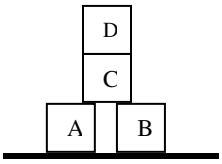
Solve the above conditional planning problem and show the plan as a graph containing causal links, the ordering constraints, the preconditions of the operations and the context of each operation. **(20 points)**

3. Solve the following blocks world domain problem using "Graphplan". For this problem you do not need to write a planner but use the "Graphplan" from (http://cseweb.uta.edu/~srajendr/graphplan.tar) and build upon it. The planner is written in C and can be compiled on OMEGA. You need to design STRIPS style operators and facts to solve the following problem. You can find further instructions on running "Graphplan" and file formats in README file. The tar file also contains example problem for you to run and familiarize yourself with "Graphplan". For this problem you need to submit the operator files, fact files and a file containing the corresponding plans (as produced by the planner) and your experience designing the operators and facts for these planning problems via email to Dr. Athitsos and TA.

   a. **For CSE 4308 Class** **(20 points)**

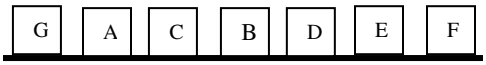
Start State

Goal State

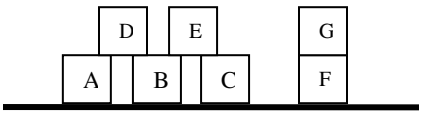


   b. **For both CSE 4308 / CSE 5360 Class** **(20 points)**

Start State

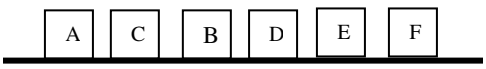


Goal State



   c. **For CSE 5360 Class** **(25 points)**

Start State



Goal State